case of human blood, its content in agglutinating substances, bactericidal substances, red blood corpuscles, albuminous substances, calcium salts, and salts generally: Dr. A. E. Wright.—(1) Wax model of the marmoset's brain; (2) sections from which the wax model was constructed: Mr. Gustav Mann.

(1) Colour printed geological maps; (2) geological model of the Isle of Purbeck: the director of the Geological Survey and Museum.—Models illustrative of mountain building: Lord Avebury, F.R.S.—(1) A set of lantern slides of microscopic sections of igneous rocks, &c.; (2) portable sounding machine for mountain lakes: Prof. E. J. Garwood.—Series of geological and other drawings and plans: Prof. J. P. O'Reilly.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—In connection with the approaching international assembly of representatives of academies, it is proposed to confer the degree of Doctor of Science *honoris causa* on Prof. Bakhuyzen, of Leyden; Dr. Faminstyn, of St. Petersburg; Dr. Mojsisovics von Mojsvár, of Vienna; Prof. Retzius, of Stockholm; Prof. Riecke, of Göttingen; and Prof. Waldeyer, of Berlin; and the degree of Doctor of Letters *honoris causa* on Count de Franqueville, of Paris; Prof. Goldziher, of Budapest; Prof. Gomperz, of Vienna; Prof. Krumbacher, of Munich; Prof. Leroy-Beaulieu, of Paris; and Dr. Perrot, of Paris.

Mr. W. J. Sell, F.R.S., and Mr. H. J. H. Fenton, F.R.S., are to be appointed university lecturers in chemistry, and Mr. A. Harker, F.R.S., a university lecturer in petrology.

THE Senate of the Royal University of Ireland has resolved to confer, *honoris causa,* the degree of Doctor of Science on Sir William Crookes and on Prof. J. Dewar.

Science states that the New York University has received an anonymous gift of 2500*l.* for the Medical College, and that the American Geographical Society has received a bequest of 6000*l.* from Sarah M. de Vaugrigneuse.

IN a paper on "Local Expenditure and Local Indebtedness in England and Wales," read by Mr. R. J. Thompson at the Royal Statistical Society on Tuesday, it was stated that education showed an increase of expenditure from 4,806,000*l.* in 1889 to a sum of nearly 11,000,000*l.* in 1902. The cost of erecting school buildings had during the same time—1889 onwards—augmented the outstanding loans from 9,937,000*l.* to 33,564,000*l.* London incurred 29 per cent. of the total expenditure, while it contributed only one-fifth of the total number of pupils.

THE inauguration on February 10 of an information bureau in connection with the University of Paris is an excellent innovation. The bureau will afford information on all matters connected with higher education in Paris, whether in Government or private institutions. Those who in this country are contemplating entering a university, and who have spent hours in trying to derive some tangible ideas from calendars and class syllabuses, will appreciate the useful purpose which would be served by a bureau of this character. If such a bureau would go a little further, and furnish to candidates for chairs and lectureships some idea of the duties they would have to perform, its value will be still greater.

THE President of the Board of Education, the Marquess of Londonderry, K.G., has appointed a departmental committee to inquire into the present working of the Royal College of Science, including the School of Mines, to consider in what manner the staff, together with the buildings and appliances now in occupation or in course of construction, may be utilised to the fullest extent for the promotion of higher scientific studies in connection with the work of existing or projected institutions for instruction of the same character in the metropolis or elsewhere, and to report on any changes which may be desirable in order to carry out such recommendations as they may make. Sir Francis Mowatt, G.C.B., is chairman of the committee, and Mr. J. C. G. Sykes, assistant secretary in the branch of the board which deals with evening schools, technology, and higher education in science and art, has been appointed secretary to the committee. The London County Council is represented on the committee.

A DEPUTATION consisting of representatives of various county councils was received by Sir William Anson on May 13 with reference to the abrogation of the arrangements which were in vogue under what was known as Clause 7 of the Directory of the Science and Art Department. The deputation explained that county councils had hoped when the Education Act became law that it would be recognised more fully than before that these councils were the authorities for all grades of education, including particularly higher education. But the new regulations taking the place of Clause 7 have reduced their powers, and county councils are hampered in the performance of the duties expected of them. In reply, Sir William Anson explained that Clause 7 was an attempt to bring local authorities into relations with the efforts being made to give science and art and technical teaching, assisted by the Board of Education, and limited in the first instance to institutions of a very different character from ordinary secondary schools. Local authorities are now in a position to deal with the whole of secondary education, and not merely with the subject-matter which was contemplated in Regulation 7. Sir William Anson, in conclusion, asked the deputation to consider the wider question which they should have in view in dealing with secondary education, and not merely from the point of view of exercising their own authority and the speedy transaction of their own business. What he deprecated was that at that early stage in the working of the Act, the Board of Education should be asked to stereotype the relations of local authorities for the secondary schools within their area.

AT the annual conversazione of the Medical Society of London on Monday, Sir Isambard Owen delivered the annual oration, taking for his subject "The Future of London Medical Education." After contrasting the interest displayed by Continental States in scientific research and public education with the indifference evinced towards them by the generality of Englishmen, and pointing out that this indifference could only be a passing phase, due to patent historical causes, he expressed the hope that the reports of the Mosely Commissioners, with their marvellous tale of recent educational progress in America and the fabulous amounts of public and private money freely lavished upon it, would at last awaken attention here to the backward state of things at the heart of the British Empire. Of all forms of higher education, he submitted, none could lay greater claim to public support than medical education. The unendowed London schools had still to carry the entire burden of the preliminary academic training of their students—a task which elsewhere was now undertaken by endowed universities and university colleges. Until the reconstitution of the University of London, no practicable way out of the difficulty could be seen. Sir Isambard Owen then detailed the plan which the university had adopted of establishing a public institute within its bounds and under its direct control to undertake teaching in physics, chemistry, biology, anatomy, and physiology for the purposes of medical students. Including buildings, the institute would cost about 375,000*l.* to establish. As the State declined all responsibility for professional education in England, the university could only look to enlightened private liberality. Wealthy men in London capable of being fired by emulation of Transatlantic gifts to education should make this modest benefaction their peculiar care.

SOCIETIES AND ACADEMIES.

LONDON.

Anthropological Institute, April 26.—Sir Thomas Holdich, K.C.M.G., &c., in the chair.—Prof. W. **Ridgeway** delivered a lecture on the origin of jewellery. Prof. Ridgeway holds that the objects employed in modern jewellery had their origin in magical properties attributed to them and not in æsthetic, although the æsthetic reason for wearing them undoubtedly influenced the wearers at an early stage (see NATURE, October 29, 1903, vol. lxviii. p. 636).

Challenger Society, April 27.—Sir John Murray in the chair.—Prof. **Minchin** exhibited specimens of the new sporozoan, *Lymphocystis johnstoni*.—Mr. E. T. **Browne** showed Medusæ from Valencia.—Dr. G. H. **Fowler** explained some graphic diagrams of the distribution of Biscayan Chætognatha, and announced that he had detected *Krohnia hamata* among specimens obtained at the Falkland Islands by Mr. Vallentin within six fathoms from the surface.—Mr. V. H. **Blackman** read a paper on the metabolism of the ocean, dealing with the close analogy between the circulation of nitrogen on land and that in the sea; this was followed by an interesting discussion.—Mr. G. P. **Farran** described the copepods of the north-east Atlantic slope; of these rather less than half present a wide and often tropical distribution, occurring also in the Indian or Pacific Oceans. The remainder are only known as Atlantic or Atlanto-Mediterranean species, many being bottom haunting forms, the recorded range of which is likely to be extended. About 12 per cent. of the total copepod fauna extends north to the Arctic regions.

British Academy, April 27.—Lord Reay, president, in the chair.—Prof. I. **Gollancz** read a paper on Shakespeariana, 1598–1602. A theory was put forward explanatory of Shakespeare's use of the name Polonius for the counsellor of the King of Denmark in place of Corambis, or Corambus, found in the first quarto, evidently the name of the character in the old play, which belonged to about the year 1587. Corambus, being discarded by Shakespeare, was used by him as a passing name in the play of "All's Well."

Physical Society, May 6.—Mr. J. Swinburne, vice-president, in the chair.—Some instruments for the measurement of large and small alternating currents: W. **Duddell.** The author, after some preliminary remarks on the available means for measuring alternating currents, proceeded to describe three thermal instruments which he has constructed for this purpose. The first instrument is essentially a sensitive Ayrton-Perry twisted strip ammeter which is very quick in action for a thermal instrument, and has been used for observing and recording P.D.'s and currents which varied as rapidly as one per second. The second instrument exhibited was a very sensitive thermal galvanometer called in the paper a "thermogalvanometer." It consists of the combination of a radio-micrometer of the "Boys" type with a very small resistance which is heated by the current to be measured, and in turn heats the thermo-junction of the radio-micrometer by radiation and convection. The third instrument described was a switchboard instrument which works on the same principle as the last.—Mr. F. E. **Smith** exhibited and described the following instruments from the National Physical Laboratory:—(1) a mercury-resistance standard; (2) a 10-ohm build-up resistance-box; (3) an astatic galvanometer.

Mathematical Society, May 12.—Dr. E. W. Hobson, vice-president, in the chair.—The following papers were communicated:—On the evaluation of certain definite integrals by means of Gamma functions, and generalisations of Legendre's formula $KE'-(K-E)K'=\frac{1}{2}\pi$: A. L. **Dixon.** It has been shown by E. B. Elliott that Legendre's relation may be regarded as a particular case of a relation by which a certain sum of products of what are really hypergeometric functions can be expressed in terms of Gamma functions. In the Weierstrassian form of Legendre's relation, a certain determinant of the second order having elliptic integrals as its elements is shown to be a constant. In the generalisation the determinant is of order higher than the second, the elements are hyperelliptic integrals, and the constant is expressed as a product of Gamma functions. The ratio of two such determinants, of suitable orders, is expressed in a similar form. Weierstrass's relations between hyperelliptic integrals of the first and second kinds are deduced. The results are extended to include a certain class of integrals which are not integrals of algebraic functions.—Perpetuant syzygies: A. **Young** and P. W. **Wood.** The perpetuants considered are linear in the coefficients of each quantic concerned, that is to say, they are "perpetuant types." All possible products of irreducible forms of a given degree and weight are arranged in a predetermined sequence so that any product may be identified by its place in the sequence. A syzygy expresses one of the products that enters into it, viz. the one that comes earliest in the sequence, in terms of others which come later in the sequence. In consequence of the existence of the syzygy this earliest product is "reducible." It is possible to enumerate the actually irreducible forms for degree δ by means of a generating function. When the irreducible products have been identified for any degree, all the independent syzygies of this degree will have been identified, there being one such syzygy for each reducible product of irreducible forms. The work can be completed as far as degree 8, but a large class of products have been discussed in general. A generating function for all irreducible products and types of degree δ is suggested in the form

$$\frac{x^{\binom{\delta}{1}+\binom{\delta}{2}+\cdots+\binom{\delta}{\kappa}}}{(1-x)^{\delta-1}}$$

and this form is proved to hold for $\kappa=1$, $\kappa=2$ and $\kappa \geqslant \frac{1}{3}\delta$.—Note on the integration of linear differential equations: Dr. H. F. **Baker.**—Some properties of the function Γ_p: **Rev.** F. H. **Jackson.**—Informal communications were made as follows:—On the geometrical representation of imaginaries: G. B. **Mathews.**—A collation of Kessler's and Hertzer's tables of the residue-index (ν) ot 10 (mod p) with Shanks's table of the Haupt exponent (ξ) of 10 (mod p): Lieut.-Colonel A. **Cunningham.** The numbers ν and ξ are defined by the congruence $10^\xi \equiv 1$ (mod $p=\nu\xi+1$). Twenty-nine errors were found in Kessler's table, 3 in Hertzer's, 107 in Shanks's.

Cambridge.

Philosophical Society, May 2.—Dr. Baker, president, in the chair.—Early development of the unfertilised egg of the sawfly *Nematus ribesii*: L. **Doncaster.** In the unfertilised egg the two maturation divisions give rise to four nuclei, the outer two of which are the halves of the first polar body, the third is the second polar nucleus, and the innermost the egg-nucleus. The second polar nucleus unites with the inner half of the first, giving the "copulation nucleus." This divides into two groups of chromosomes, which persist without important change until the blastoderm begins to form, beyond which stage their fate has not yet been followed. The egg-nucleus soon begins to divide, and gives rise to the embryo, the chromosomes remaining at the reduced number. The outer nucleus of the first polar body rapidly disappears. These results are very similar to those obtained by Petrunkewitsch in the bee, where, as in this case, virgin eggs produce males, and fertilised eggs females. It was pointed out that a comparative study of the development of sawflies which produce males and females respectively from virgin eggs would provide a test of Castle's hypothesis of sex-determination.—Metallic "passivity" in relation to time and temperature: Dr. W. A. **Hollis.**—(1) On partial fractions; (2) note on plane unicursal curves; (3) on the order of certain systems of conditions: Dr. A. C. **Dixon.**

Paris.

Academy of Sciences, May 9.—M. Mascart in the chair.—The president announced to the academy the death of M. Duclaux, member of the section of rural economy, and gave a short account of his life work.—Remarks on the use of alternating currents in chemistry and on the theory of reactions which they set up: M. **Berthelot.** Remarks on the recent work of MM. Brochet and Petit concerning the solution of platinum in a solution of potassium cyanide by the action of an alternating current. The author directs attention to a similar reaction with glucose studied by him in 1879. The bearing of these experiments on the action of the silent discharge is also discussed.—The cooling power of a feebly conducting liquid current on an indefinite cylinder, the axis of which is normal to the current: J. **Boussinesq.**—On a new method of preparation of alkyl and alkylidene derivatives of cyclic ketones. The application to the preparation of alkyl-menthones: A. **Haller.** By treating certain cyclic ketones, such as menthone, with sodium, the corresponding alcohol is formed besides the sodium derivative, and in preparing alkyl derivatives this leads to undesirable secondary products. The formation of the alcohol is avoided if sodium amide is used instead of sodium, and the alkyl iodide can be added directly to the reaction product. The physical properties of several homologues of menthone which have been prepared in this way are described.—An arrangement allowing identical results to be obtained with X-ray tubes on different occasions: M. **d'Arsonval.** The current passing through the tube is measured by means of a milliammeter of the d'Arsonval type. For a tube with a given vacuum, the amount of X-rays given off, as measured by their photographic effect, is proportional to the intensity of the current passing through the tube, and this appears to be true of various makes of tube.—M. Barrois was elected a member in the section of mineralogy in the place of the late M. Fouqué.—Observations of the Brooks comet (1904 *a*) made at the Observatory of Algiers with the 31·8 cm. bent equatorial: MM. **Rambaud** and **Sy.**—The linear *connexe* in space of $n-1$ dimensions: Léon **Autonne.**—On the radio-activity of gases given off from the water of thermal springs: P. **Curie** and A. **Laborde.** The radio-activity of samples of gas from various mineral waters was measured and its rate of decay determined, the results being compared with the radio-activity of air which had been in contact with a known amount of radium bromide. The radio-activity was in all cases very small, and it hardly appears possible to draw any conclusion as to the action the radio-activity may play in the physiological actions of mineral waters.—On the melting point of gold: Daniel **Berthelot.** It is pointed out that all the recent values for the melting point of gold fall between 1064° and 1067°.—On the fixity of the solar rays: Maurice **Hamy.** The author has previously shown that there is a slight variation in the wave-length of the λ 508 cadmium ray according as a tube with or without electrodes is employed. Since the physical conditions in the sun are liable to considerable variation at times, the question is raised as to how far the solar lines can be regarded as possessing absolutely fixed wave-lengths.—The proof of a radio-activity induced on all bodies by the emanation from incandescent metallic wires: Th. **Tommasina.**—The action of anæsthetics on the sources of the n-rays: Jean **Becquerel.**—On some points of technique for the examination of organs by means of the n-rays. First results relating to a study of the brain: André **Broca.**—On the mode of propagation of nervous oscillations: Augustin **Charpentier.**—Electrical osmosis in methyl alcohol: A. **Baudouin.**—On the atomic weight of samarium: G. **Urbain** and H. **Lacombe.** The samarium salts were obtained from three different sources, and atomic weight determinations of the various fractions, together with the spectroscopical examination, showed that the oxide was homogeneous. The final value for the atomic weight of samarium ($O=16$) is 150·34.—The formation of hydrogen silicide by direct synthesis from its elements: Ém. **Vigouroux.** Remarks on a recent paper by M. Dufour on the same subject.—The apparent volatilisation of silicon in hydrogen: A. **Dufour.** In Geissler tubes filled with hydrogen arsenide, the arsenic deposited by the discharge is displaced by distillation pure and simple; in tubes filled with hydrogen silicide, the displacement of the silicon under similar conditions is explained by the formation of hydrogen silicide in the warm parts of the tube and its decomposition in the dark space.—On a property of tin-aluminium alloys: Hector **Pécheux.**—The differentiation of the primary, secondary and tertiary alcohols of the fatty series: André **Kling** and Marcel **Viard.** The method adopted is based on the fact that tertiary alcohols are decomposed at the temperature of boiling naphthaline, whilst at the temperature of boiling anthracene only primary alcohols resist decomposition. The vapour density of the alcohol under examination is taken in a Victor Meyer apparatus with the above two liquids as vapour jackets, the deviation from the theoretical density showing to which class the alcohol belongs. About 250 determinations have been made by this method, a summary of which is given.—On the formation of the chloroanilines: Eyvind **Bœdtker.**—On the saponifying power of the castor oil seed: Maurice **Nicloux.**—On the structure of the heart in Cephalopods: F. **Marceau.**—The resistance of certain seeds to the action of absolute alcohol: Paul **Becquerel.** The tegument of the moist grain allowing of osmosis is permeable to absolute alcohol, but when dried to a certain extent, osmosis no longer takes place, and the skin is now absolutely impermeable to alcohol.

DIARY OF SOCIETIES.

THURSDAY, May 19.

Royal Society, at 4.30.—The Bakerian Lecture will be delivered by Prof. E. Rutherford, F.R.S., on the Succession of Changes in Radioactive Bodies.—The following papers will be read in title:—The Spectrum of the Emanation of Radium: Sir William Ramsay, K.C.B., F.R.S.—On Saturated Solutions: Earl of Berkeley.—On the Liquefied Hydrides of Phosphorus, Sulphur, and the Halogens, as Conducting Solvents. Part i.: B. D. Steele and D. McIntosh.—On the Liquefied Hydrides of Phosphorus, Sulphur, and the Halogens, as Conducting Solvents. Part ii.: D. McIntosh and E. H. Archibald.—On the General Theory of Integration: Dr. W. H. Young.

Institution of Mining and Metallurgy, at 8.—Miners' Phthisis—its Causes and Prevention: Dr. J. S. Haldane and R. A. Thomas.

Institution of Electrical Engineers, at 8.—Discussion on Messrs. Parsons, Stoney and Martin's paper, entitled The Steam Turbine as applied to Electrical Engineering.

FRIDAY, May 20.

Royal Institution, at 9.—The Radiation and Emanation from Radium: Prof. E. Rutherford, F.R.S.

TUESDAY, May 24.

Royal Institution, at 5.—The Solar Corona: H. F. Newall, F.R.S.

Linnean Society, at 8.—Anniversary Meeting.

WEDNESDAY, May 25.

Geological Society, at 8.—Occurrence of a Limestone with Upper Gault Fossils at Barnwell, near Cambridge: W. G. Fearnsides.—Age of the Llyn-Padarn Dykes: J. V. Elsden.

Victoria Institute, at 4.30.—The Tanganyika Problem: W. H. Hudleston, F.R.S.

THURSDAY, May 26.

Royal Institution, at 5.—Literature and the State: H. G. Wells.

Institution of Electrical Engineers, at 8.—Annual General Meeting.

FRIDAY, May 27.

Royal Institution, at 9.—The Progress of Oceanography: H.S.H. Albert Prince of Monaco.

Physical Society, at 5.—The Law of Action between Magnets and its bearing on the Determination of the Horizontal Component of the Earth's Magnetic Field with Unifilar Magnetometers: Dr. C. Chree, F.R.S.—On the Ascertained Absence of Effects of Motion through the Ether in Relation to the Constitution of Matter on the FitzGerald-Lorentz Hypothesis: Prof. J. Larmor, Sec.R.S.—On Coherence and Recoherence: Dr. P. E. Shaw and C. A. B. Garrett.

SATURDAY, May 28.

Royal Institution, at 3.—Spitsbergen in the 17th Century: Sir W. Martin Conway.

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